In the claims:

Please cancel claim 9 and amend Claims 1-8 and 10-41 as follows:

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1. (Currently amended) A method for optical-light scanning of a specimen using ~~with~~ a scanning microscope with an optical element, the method comprising ~~comprises the steps of~~:

providing a focused light beam, wherein the focused light beam defines a beam path characterized by a light beam intensity;

scanning the focused light beam across a specimen region ~~(3) thereby~~ to define ~~defining~~ a current focus position ~~(2)~~; and

using the optical element disposed along the beam path to regulate ~~regulating~~ the light beam intensity ~~of the light beam~~ by determining a function of the current focus position ~~(2)~~ of the focused light beam in the specimen region ~~(3) of the scanned, focused light beam~~.

λ1

2. (Currently amended) The method as defined in Claim 1, ~~characterized in that the step of~~ wherein using the optical element ~~regulating the intensity of the light beam is accomplished~~ comprises determining ~~as a~~ the function of ~~the~~ a current axial focus position.

3. (Currently amended) The method as defined in Claim 1, ~~characterized in that the step of~~ wherein using the optical element ~~regulating the intensity of the light beam is accomplished~~ comprises determining ~~as a~~ the function of ~~the~~ a current lateral focus position.

4. (Currently amended) The method as defined in Claim 1, ~~characterized in that the~~ wherein the current focus position~~s in a specimen region that~~ is defined by a ~~an~~ user.

5. (Currently amended) The method as defined in Claim 1, further comprising ~~comprises the steps of~~ mounting the specimen on a mounting medium, the mounting medium defining a refractive index, wherein using the optical element ~~regulating the intensity of the light beam is accomplished~~ comprises determining ~~as a~~ the function of the refractive index.

6. (Currently amended) The method as defined in Claim 1, ~~characterized in that light intensity regulation is accomplished~~ wherein using the optical element disposed along the beam path to regulate the light beam intensity by determining a function of the current focus position further comprises utilizing an expert system implemented in a control computer of the scanning microscope in conjunction with the optical element. ~~an expert system implemented in a control computer of the scanning microscope~~.

A1 end

7. (Currently amended) The method as defined in Claim 1, further comprising: ~~comprises the step of~~: recording data; and

visualizing the data based on the information about the light beam intensity at the step of recording. ~~, thereby taking information into account concerning light intensity regulation during the recording of data~~.

8. (Currently amended) The method as defined in Claim 7, further comprising implementing ~~characterized in that~~ a computer restoration method or a digital reconstruction method by using the information about the light beam intensity at the recording step. ~~is implemented and the information regarding light intensity regulation during recording data is taken into account in the computer restoration method or the digital reconstruction method~~.

9. (Cancelled)

10. (Currently amended) The method as defined in Claim 1 ~~9~~, ~~characterized in that the~~ wherein the optical element is an active optical element ~~(9) consists essentially of~~ comprising an acousto-optical modulator (AOM), an acousto-optical tunable filter (AOTF) or an acousto-optical deflector (AOD).

A2

11. (Currently amended) The method as defined in Claim 1 ~~9~~, wherein the optical element ~~characterized in that light intensity regulation~~ is ~~accomplished with~~ a passive optical element ~~(9)~~ ~~arranged in the beam path (7, 8) of the scanning microscope (1)~~.

12. (Currently amended) The method as defined in Claim 11, wherein the passive optical element is ~~characterized in that~~ a neutral density filter disk ~~is used as the passive optical element (9)~~.

13. (Currently amended) The method as defined in Claim 1, wherein the focused light beam is generated by ~~characterized in that~~ a light source ~~(10) generates the light beam and the~~ and wherein using the optical element to regulate the light beam intensity ~~regulation is accomplished at~~ comprises varying the intensity of the light source ~~(10)~~.

A2 cont

14. (Currently amended) The method as defined in Claim 6, wherein ~~characterized in that~~ the control computer ~~(11) of the scanning microscope (1) activates~~ controls the ~~active, passive~~ optical element ~~(9)~~ and ~~the~~ a light source ~~(10)~~.

15. (Currently amended) The method of Claim 1, ~~characterized in that~~ further comprising;

providing a transmission detection apparatus ~~(13) is provided in~~ coupled with the scanning microscope ~~(1); and~~

using the transmission detection apparatus to detect a maximum signal yield ~~(13) is adapted~~ as a function of the current focus position ~~(2)~~ in the specimen region. ~~of the scanned, focused light beam, in such a way that a maximum signal yield is detectable with the transmission detection apparatus (13)~~.

16. (Currently amended) The method as defined in Claim 15, wherein the ~~characterized in that the~~ transmission detection apparatus comprises a lens system responsive to ~~as~~ a function of ~~the~~ a current axial focus position ~~(2)~~.

17. (Currently amended) The method as defined in Claim 16, wherein the lens system ~~characterized in that adaptation is accomplished by positioning the of the transmission detection apparatus (13)~~ is disposed in ~~the~~ an axial direction.

18. (Currently amended) The method of ~~as defined in~~ Claim 16, further comprising the lens system having a magnification and being responsive to the function ~~characterized in that adaptation is accomplished~~ by changing the magnification. ~~of the lens system of the transmission detection apparatus (13)~~.

19. (Currently amended) The method of ~~as defined in~~ Claim 16, further comprising ~~characterized in that~~ a transmission detector ~~is attached to~~ ~~the~~ coupled to the transmission detection apparatus ~~(13)~~ and ~~the~~ ~~transmission detector of the transmission detection apparatus (13) is correspondingly adapted as a function of the~~ responsive to a function of the current focus position ~~(2)~~.

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20. (Currently amended) The method of ~~as defined in~~ Claim 19, wherein the transmission detector is responsive to the function of the current focus position ~~characterized in that adaptation is accomplished~~ by being positioned ~~positioning the transmission detector of the transmission detection apparatus (13)~~ in ~~the~~ an axial direction.

21. (Currently amended) A scanning microscope for scanning a specimen comprising:

a light source for generating a focused light beam defining a beam path of a light beam intensity;

means for scanning the focused light beam across a specimen region ~~(3) thereby defining~~ to define a current focus position ~~(2)~~, and

an optical element disposed along the beam path for regulating the light beam intensity ~~of the light beam~~, by determining a function of the current focus position ~~(2)~~ in the specimen region ~~(3)~~ of the ~~scanned,~~ focused light beam.

22. (Currently amended) The scanning microscope as defined in Claim 21, wherein the ~~characterized in that the~~ ~~means~~ the optical element for regulating the light beam intensity ~~of the light beam~~ ~~incorporate~~ further comprises means for regulating the light beam intensity of the focused light beam as a function of ~~the~~ a current axial focus position.

23. (Currently amended) The scanning microscope as defined in Claim 21, <u>wherein the</u> ~~characterized in that the~~ ~~means~~ <u>the optical element</u> for regulating the <u>light beam</u> intensity ~~of the light beam~~ ~~incorporate~~ <u>further comprises</u> means for regulating the <u>light beam</u> intensity of the <u>focused</u> light beam as a function of ~~the~~ <u>a</u> current lateral focus position.

24. (Currently amended) The scanning microscope as defined in Claim 21, <u>further comprising</u> ~~characterized in that~~ means <u>for defining focus positions in the specimen region by a user.</u> ~~are provided that the focus positions in a specimen region is defined by an user~~.

A2 cont

25. (Currently amended) The scanning microscope as defined in Claim 21, <u>further comprising</u> ~~characterized in that~~ a control computer<u>,</u> ~~is provided~~ with ~~the scanning microscope and~~ an expert system <u>to regulate the light beam intensity</u> ~~is implemented the control computer for performing the light intensity regulation~~.

26. (Currently amended) The scanning microscope as defined in Claim 21, <u>further comprising</u> ~~comprises~~ means for recording and visualizing data in response to ~~and the means for recording and visualizing data take information into account concerning light intensity~~ regulation <u>of the light beam intensity</u> during the recording of <u>the</u> data.

27. (Currently amended) The scanning microscope as defined in Claim 21, <u>wherein the optical element for regulating the light beam intensity is an active optical element.</u> ~~characterized in that the scanning microscope (1) defines a beam path (7, 8) and an active optical element (9) is positioned in the beam path (7, 8) to accomplish light intensity regulation.~~

28. (Currently amended) The scanning microscope as defined in Claim 27, <u>wherein the</u> ~~characterized in that the~~ active optical element ~~(9) consists essentially of~~ <u>is</u> an acousto-optical modulator (AOM), an acousto-optical tunable filter (AOTF) or an acousto-optical deflector (AOD).

29. (Currently amended) The scanning microscope as defined in Claim ~~27~~ 21, wherein the optical element for regulating the light beam intensity is ~~characterized in that light intensity regulation is accomplished with~~ a passive optical element ~~(9) arranged in the beam path (7, 8) of the scanning microscope (1)~~.

30. (Currently amended) The scanning microscope as defined in Claim 29, wherein the ~~characterized in that a neutral density filter disk is used as the~~ passive optical element ~~(9)~~ is a neutral density filter disk.

A2 cont

31. (Currently amended) The scanning microscope as defined in Claim 21, wherein the ~~characterized in that the~~ light beam intensity ~~regulation~~ is regulated ~~accomplished at~~ by regulating the intensity of the light source ~~(10)~~.

32. (Currently amended) The scanning microscope as defined in ~~the~~ Claims ~~27~~ 21, wherein the light source and the optical element for regulating the light beam intensity is operated by a ~~characterized in that the~~ control computer. ~~(11) of the scanning microscope (1) activates the active, passive element (9) and the light source (10)~~.

33. (Currently amended) The scanning microscope as defined in Claim 21, further comprising ~~characterized in that~~ a transmission detection apparatus ~~(13) is provided in the scanning microscope (1), the transmission detection apparatus (13) is~~ adapted in a manner responsive to the current focus position to receive a signal yield~~, as a function of the current focus position (2) in the specimen region of the scanned, focused light beam, in such a way that a maximum signal yield is detectable with the transmission detection apparatus (13)~~.

34. (Currently amended) The scanning microscope as defined in Claim 33, wherein the ~~characterized in that the~~ transmission detection apparatus comprises a lens system~~, and the lens system of the transmission detection apparatus is correspondingly~~ adapted ~~in a manner~~ responsive to ~~as a function of the~~ a current axial focus position ~~(2)~~.

35. (Currently amended) The scanning microscope as defined in Claim 34, wherein the lens system is responsive to the current axial focus position ~~characterized in that adaptation is accomplished~~ by positioning the lens system in ~~of the transmission detection apparatus (13) in the~~ an axial direction.

36. (Currently amended) The scanning microscope as defined in Claims 34, wherein the lens system is characterized by a magnification and is responsive to the function ~~characterized in that adaptation is accomplished~~ by changing the magnification. ~~of the lens system of the transmission detection apparatus (13)~~.

A2 Cont

37. (Currently amended) The scanning microscope as defined Claims 34, wherein ~~characterized in that a transmission detector is attached to~~ the transmission detection apparatus comprises a ~~(13) and the~~ transmission detector ~~of the transmission detection apparatus (13) is correspondingly adapted~~ responsive to the ~~as a function of the~~ current focus position ~~(2)~~.

38. (Currently amended) The scanning microscope as defined in Claim 37, wherein the transmission detector is positioned ~~characterized in that adaptation is accomplished by positioning the transmission detector of the transmission detection apparatus (13)~~ in ~~the~~ an axial direction.

39. (Currently amended) The scanning microscope as defined in Claim 21, wherein the specimen to be scanned is ~~characterized in that fluorescing specimens are~~ excited using ~~with~~ a one-photon excitation process.

40. (Currently amended) The scanning microscope as defined in Claim 21, wherein the specimen to be scanned is ~~characterized in that fluorescing specimens are~~ excited using ~~with~~ a two-photon excitation process.

A2 end

41. (Currently amended) The scanning microscope as defined in Claim 21, wherein the specimen to be scanned is ~~characterized in that fluorescing specimens can be~~ excited using ~~with~~ a multi-photon excitation process.